Glacial archaeology – unlocking the climate time machine

Description

Glacial archaeology is a new and emerging field made possible by the increasingly rapid melting of mountain ice due to climate change. Recent discoveries have left experts amazed.

Dr Doug McNeall, co-host on the Met Office's Mostly Climate podcast, chats with Dr Lars Pilø, a Norwegian glacial archaeologist, on how the disappearing ice is revealing secrets from the past.

A 500 AD arrow is one of the treasures that have been revealed by the shrinking ice in Norway's mountains.

Climate projections indicate nearly half the world's mountain glaciers could disappear by the end of this century, even if the world meets its most ambitious climate goals. The consequences of this are far reaching.

The volume of ice on Earth has advanced and retreated over millennia. Yet the recent rate of melting of the cryosphere – the world of ice – has been far more rapid due to human influence. Ice has retreated on a time scale of decades rather than millennia, and this accelerated glacial shrinking over high ground has exposed ancient objects.

Most of Lars Pilø's work is in the mountains of Norway, where ancient ancestors hunted reindeer as they escaped the biting insects of the lowlands. He talks about the incredible sight when a relic, which was encased in ice, is found.

Lars Pilø said: "It doesn't look old: the ice acts as a time machine." Some pieces date back 6000 years, when temperatures were higher in a period following the Holocene Thermal Optimum.

Many of Lars' discoveries also pinpoint a time when the mountain ice was far greater than now, when society across the northern reaches of Norway existed across an icy landscape. Lars describes finding many items lost over time, across ancient hunting sites and old ice-bound transport routes. From skeletons of dead animals to remnants of packhorse sleds. It's a treasure trove of material culture now exposed as the glaciers recede.

Interestingly he and his team still use packhorses to reach certain remote sites – an adept way of transporting specialist equipment and provisions for an extended survey.

Glacial archaeology is also conducted across other icy realms in the Northern Hemisphere, from North America to the Alps: all regions experiencing similar challenges from mountain glacial melt.

Bittersweet

For researchers, the satisfaction of working in glacial archaeology is bittersweet. For all the excitement of discovering artefacts seemingly as fresh as the day they were lost, they know that their study is a race against time. In future the ice may not encase the land again, and in some places might be gone

forever.

Although not a linear decline, Lars confirms there is a continual glacial net loss and so it's a matter of urgency to retrieve historic items that reveal more about how communities lived under different climatic environments.

Dr Lars Pilø is the founder of the "Secrets of the Ice" website and twitter feed. Hear more about his work on the Mostly Climate podcast.

Date Created
March 2023

Has it been an unusually cold start to March?

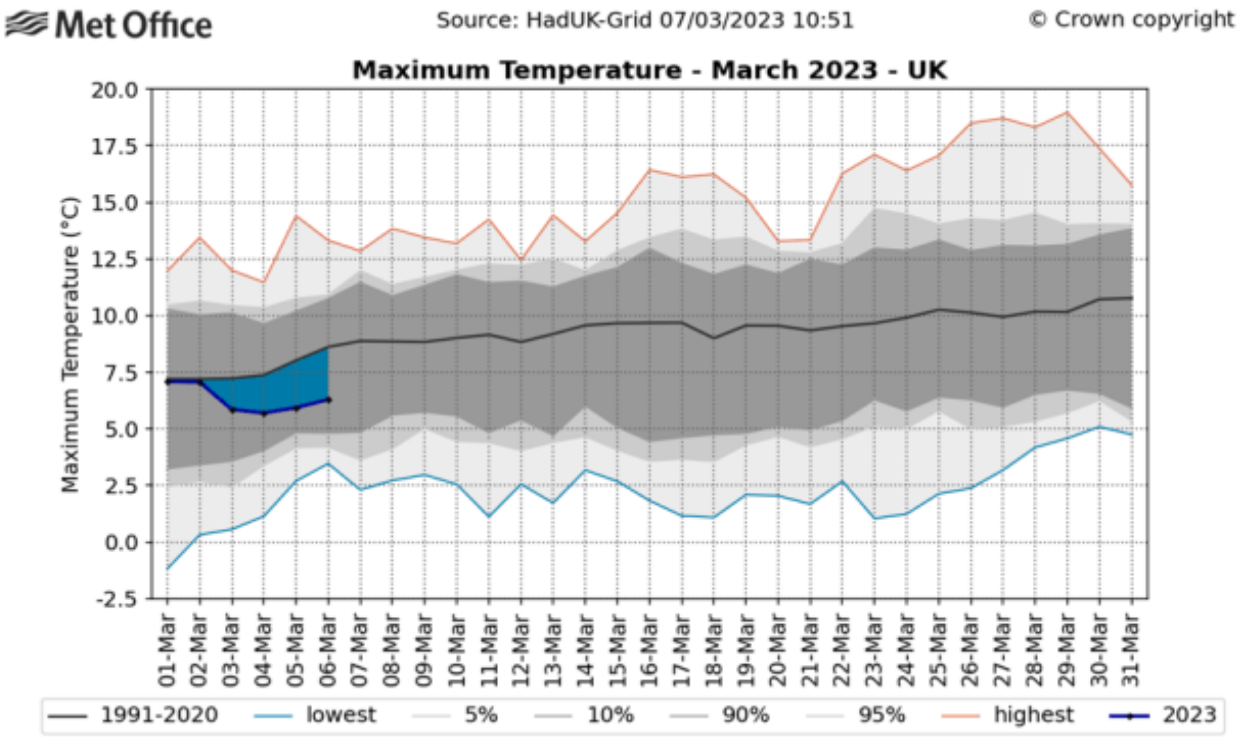
Description

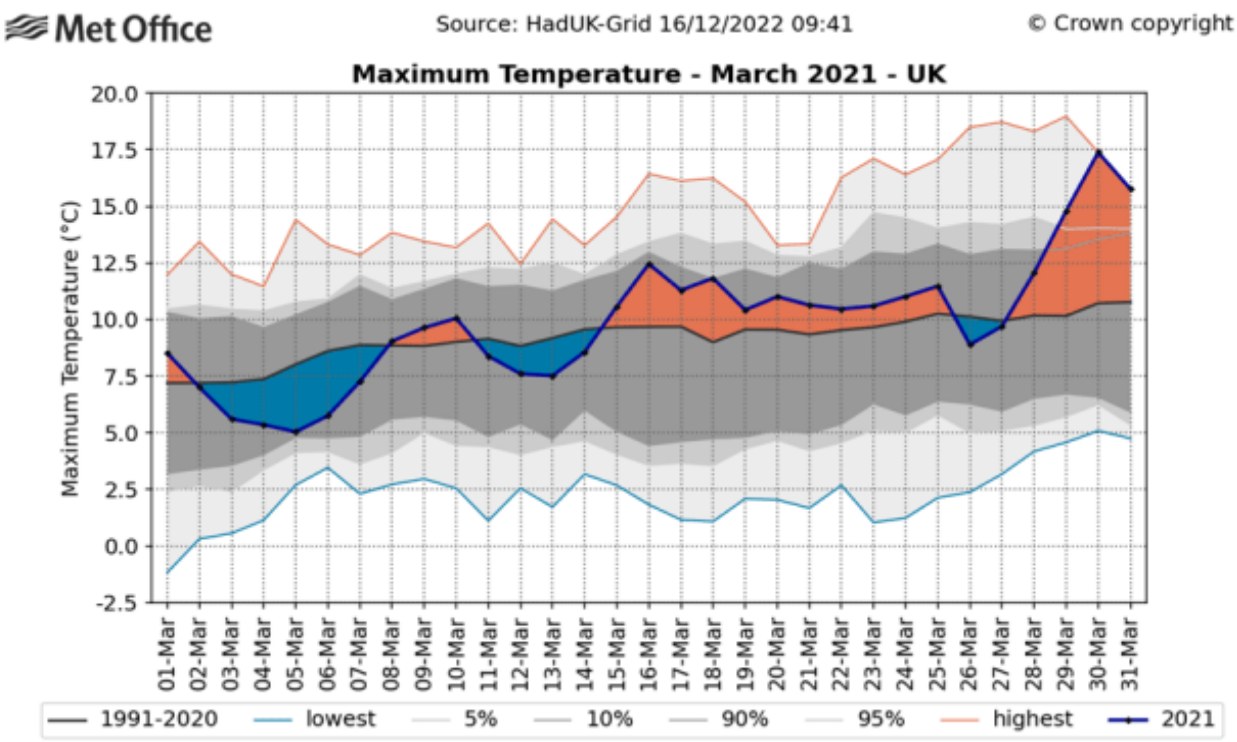
March heralds the start of Meteorological Spring, and with daffodils, snowdrops and crocuses making an appearance many of us start to think of warmer sunshine and longer days. March 2023 has got off to a cold start, and with numerous snow and ice warnings across the UK it is a fair question to ask if this is an unusual start to Spring in the UK.

The short answer to this question is: no. The ‘transition’ seasons in the UK, Spring and Autumn, can often be highly variable, with changes in the conditions across the country as we move from winter towards summer and vice-versa. Indeed, statistically it is marginally more likely to snow in March than it is in December in the UK.

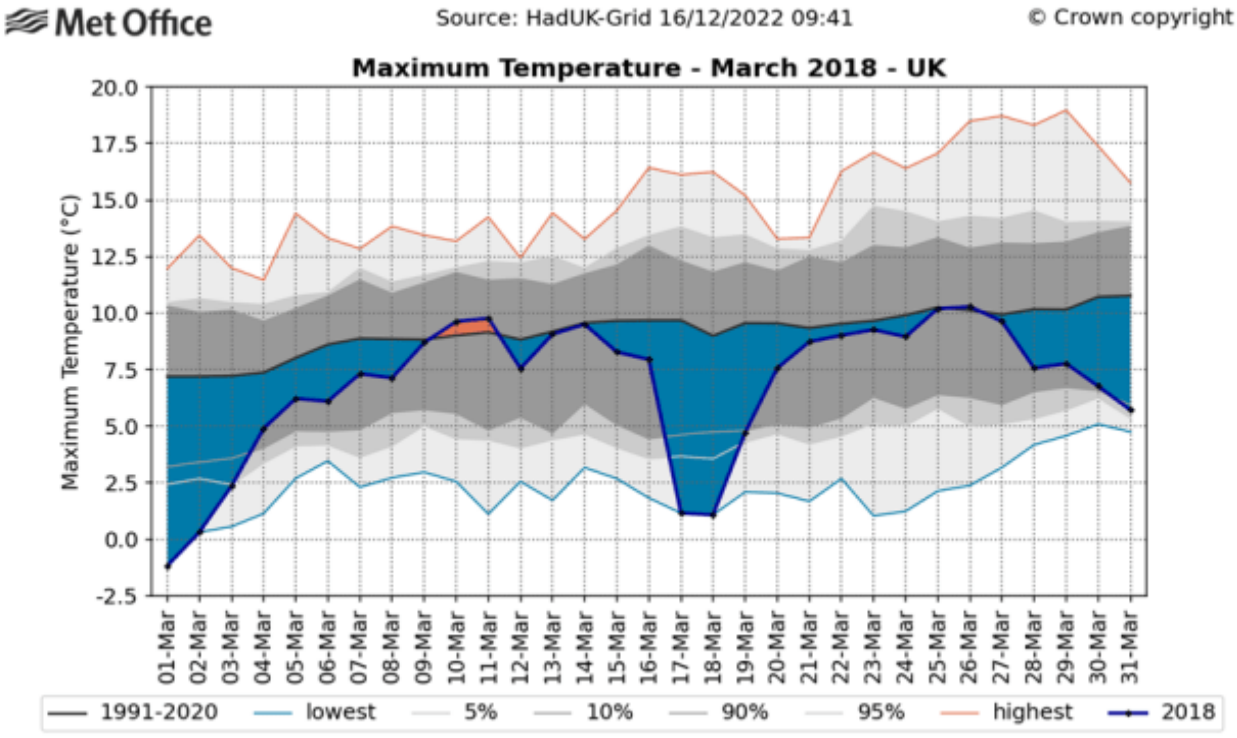
Comparisons of temperature

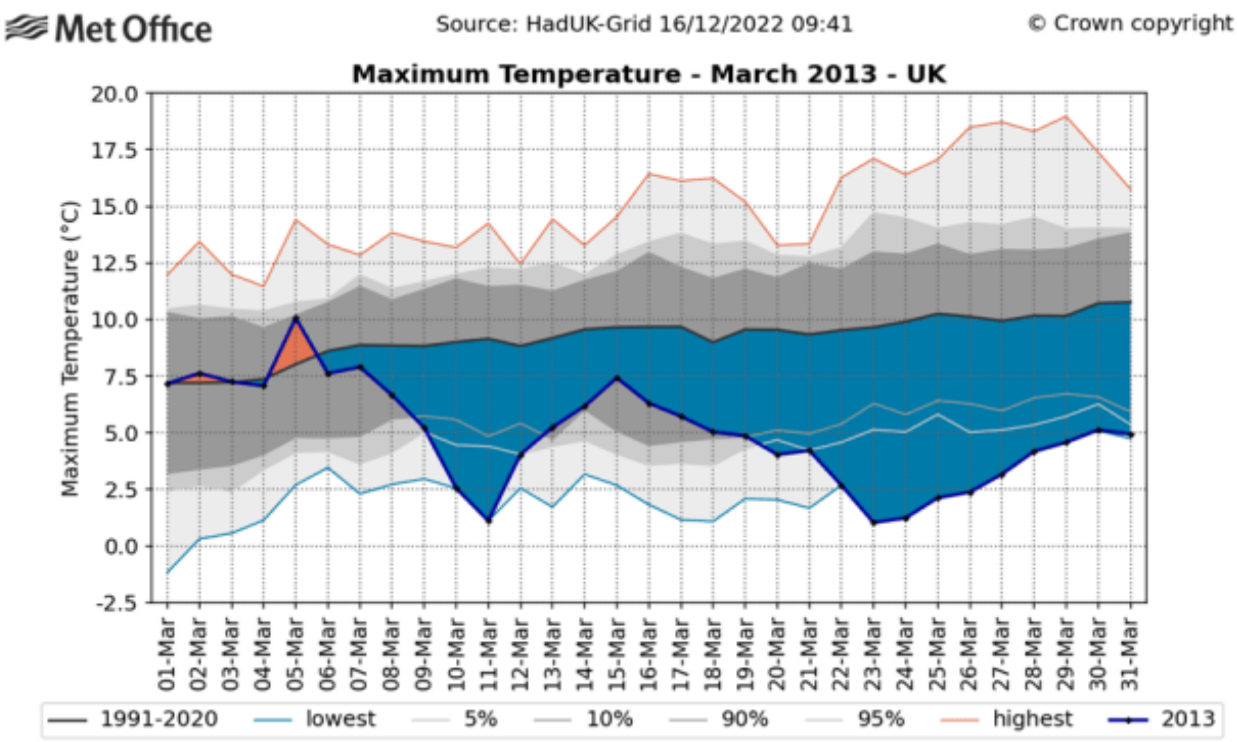
You don’t have to look back too far in the observational record to find a similar start to March, as Dr Mark McCarthy from the Met Office National Climate Information Centre explains: “If we look back at the start of March in 2021, the maximum temperatures for the UK were very similar to the values we’ve seen at the start of March 2023. The graphs below show in blue how temperatures have been below average and are very similar. Through mid-to-late March 2021 temperatures then became milder than average, as shown in orange.”





Going back further, March 2018 and 2013 were also both notably cold months, as shown in the graphs below. In terms of mean monthly temperatures for the UK, 2013 was considerably colder than 2018, and March 2013 was the coldest March for UK mean temperature since 1962 (ranking 5th coldest in the series back to 1884).





Snow comparisons

For significant March snowfall many people will remember the March of 2018 with widespread freezing conditions that also delivered a lot of snow across much of the UK.

Dr McCarthy adds: “For the first three days of March 2018 there were more than 100 weather observation stations recording at least 2cm of lying snow. Just over 50 of these stations had 10cm or more for those first three days. In some locations this snow persisted until 18 March when there was another widespread snow event.

“March 2013 was another snowy month, however this time the snow events were more clustered towards the end of the month.”

It is too early to assess how the snow record for March 2023 will sit alongside March records in previous years. However, with plenty of impactful snow in the forecast, it will certainly be a memorable cold spell for many. Keep up to date with the Met Office forecast and severe weather warnings.

Date Created
March 2023

Do you know what climate action to take for a safer future?

Description

The science is clear, the climate is changing. The Met Office is one of the UK's foremost climate change research centres, carrying out world-leading research.

With over 8,100 peer-reviewed articles in scientific literature since 1981, and as a leading contributor to international climate research such as Intergovernmental Panel on Climate Change (IPCC) reports, the Met Office has a deep understanding of how greenhouse gas emissions are impacting our climate. We also know that rapid and significant cuts to emissions can still help us to mitigate against the worst impacts of climate change.

Desire to change

The Met Office asked a representative sample of the British public about the climate action they are taking and their perceptions on whether people in the UK are doing enough to reduce their carbon footprint.

The results showed that over half of those surveyed (59%) are making conscious decisions to live a low-carbon lifestyle, including 17% who make these decisions even when it is inconvenient for them.

When asked if people in the UK are doing enough to lower their carbon footprints, nearly two thirds (65%) of respondents said we should be doing more.

This suggests that a majority of the British population are willing to make conscious efforts when it comes to cutting emissions, so let's turn our attention to some of the steps people can take at a personal level.

In order to minimise the damage from climate change, action is needed at all levels of society, but here we explore what actions people can consider taking in their lives that will have the greatest impact. Whilst not everyone will be able to make these changes, for a variety of reasons, it is worth reflecting on what is achievable so that our combined efforts can make a real difference. Many of these changes also have co-benefits – that's to say they might also reduce costs, improve air quality or have a positive impact on health and wellbeing.

Transport

Whilst a large proportion of UK adults rarely or never fly, for those that do, taking one fewer long-haul flight a year can make a significant impact on your carbon footprint.

Electric car being charged. Image: Shutterstock

A much larger proportion of people have access to a car or van, with only 22% of UK households without a car[1]. When buying a car, switching from a petrol/diesel vehicle to an electric one will reduce carbon emissions and be cheaper to run. Whilst they can be more expensive to buy, in many cases they have a lower cost over four years. Find out more in this article from the Office for Zero Emission Vehicles which debunks some of the myths around electric vehicles.

Food

The food we eat and the food we throw away is responsible for a notable proportion of our individual carbon footprint, so changing what we eat and reducing food waste can help lower this.

Food market with fruit and vegetables. Image: Shutterstock

The Climate Change Committee recommends a 20% reduction in meat and dairy consumption by 2030 [2] and the UK Government's Eatwell Guide includes some suggestions of alternative protein sources, many of which are cheaper than meat. You can find out how to reduce your food waste at Love Food Hate Waste, which will save you money as well as reduce pressure on land use. Wrap[3] calculate that waste food in the UK would make over 15 billion meals a year.

Home

According to the Sixth Carbon Budget on buildings from the Climate Change Committee, direct greenhouse gas emissions from buildings were around 17% of the UK total in 2019. Lowering demand for heating homes can help reduce this through insulation and smart heating controls. A bigger shift, however, is required in terms of the fuels used to heat homes. Approximately 74% of the UK's heating and hot water demand in buildings is met by natural gas[4], and the Government's Net Zero Strategy indicates the need to move to heat pumps (air- and ground-source) and hydrogen boilers to decarbonise buildings. Whilst these are expensive options, grants are available towards the cost of heat pumps. You can find out more about saving energy in your home at GOV.UK.

Small actions also count!

We have focussed here on some of the most important changes people can consider making to their lives in terms of reducing greenhouse gas emissions, but even the small actions can make adifference. Take a look at our everyday actions webpage for some suggestions of ‘quick wins’ – manyof these come at no or very little cost.

Adaptation remains important

Even if greenhouse gas emissions are reduced, we’re already committed to a level of global warming and associated impacts from past emissions released into the atmosphere. It is therefore important to plan for these changes and mitigate the risk. Learn more about adaptation.

Follow #GetClimateReady on Twitter to learn about climate change and science and look out for more practical ways you can take action on climate change.

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[1] Department for Transport – National Travel Survey 2021: Household car availability and trends in car trips

[2] The Climate Change Committee – https://www.theccc.org.uk/2022/06/13/governments-food-strategy-a-missed-opportunity-for-the-climate/

[3] WRAP – https://wrap.org.uk/taking-action/food-drink/actions/action-on-food-wastev

[4] The climate Change Committee – https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-Buildings.pdf

Date Created
March 2023

‘Critical’ Global Stocktake counting down to help keep Paris promises

Description

The current decade is a critical decade for climate action. What we do now will be a deciding factor in whether we can constrain global temperature rise to 1.5°C or below.

The urgency is clear, but what keeps the ambition on track? Answer: the Global Stocktake, often referred to as the GST.

In our post we focus on just two aspects of the broad reach of the Global Stocktake:

- Mitigation – where the world tries to reduce the atmospheric concentration of greenhouse gases
- Adaptation – where governments and communities strive to adapt to the levels of climate change impact which are already dialled in to the climate system through previous or ongoing greenhouse gas emissions

What is the Global Stocktake?

The GST – first mentioned as part of the Paris Agreement in 2015 – is designed to support the implementation of the Paris agreement. It encourages information gathering and dialogue between countries and experts.

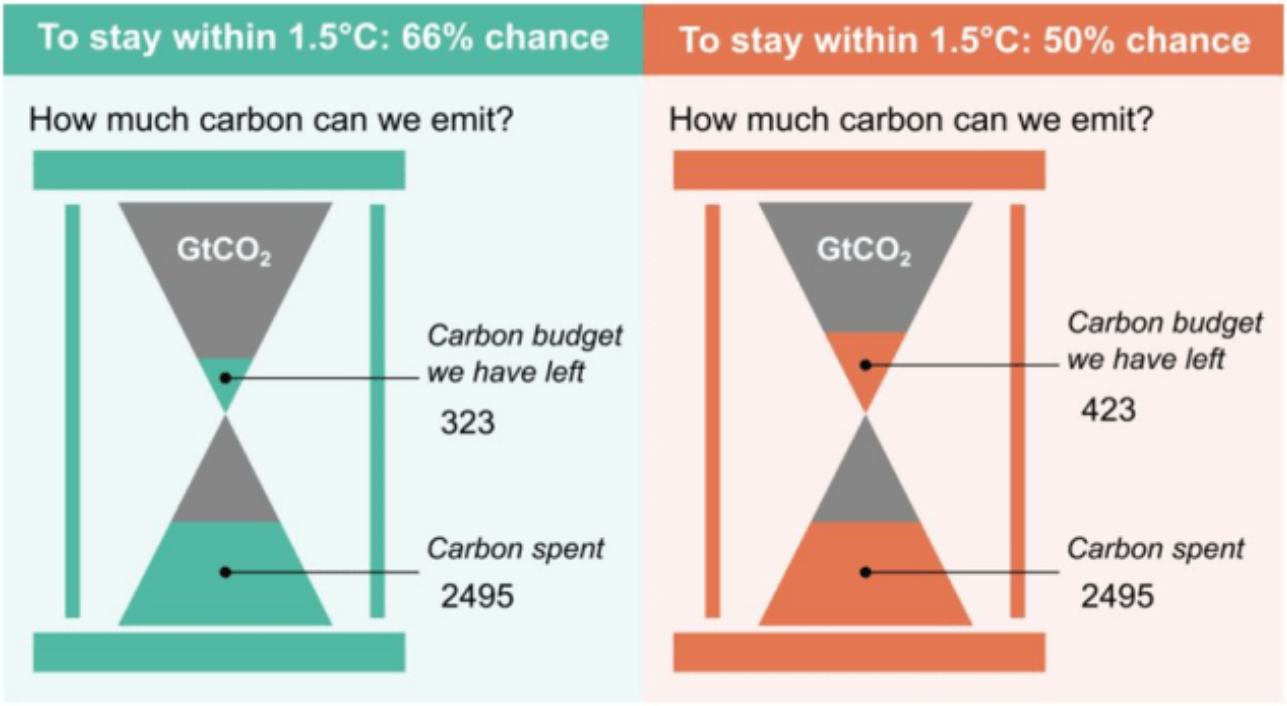
Dr Camilla Mathison is a Met Office expert on carbon budgets. She said: “The two-year process – which is repeated every five years – is crucial for enhancing and galvanizing collective ambition toward the long-terms goals of the Paris Agreement.

“Without this process there would be few other ways for the world to track progress towards long-term climate goals as well as ensure it keeps the promises it made seven years ago.”

Dr Laila Gohar is a Met Office climate scientist specialising in climate mitigation. She said: “The first Global Stocktake is due to report at the next global climate summit in Dubai later this year. Previous stages in the stocktake have shown the world is not on track on climate action.

“While there has been an observed slowing in the increase in emissions, we have not yet seen greenhouse gas emissions reduce.”

Emissions reduction urgency



Remaining carbon budgets from the start of 2022 for two likelihoods of achieving 1.5°C. 1850-2021 budget spent from GCB2022 Table 8. Remaining budget updated from AR6 SPM Table SPM2 and GCB2022.

Dr Mathison added: “The cumulative release of greenhouse gas emissions since 1850 has been unevenly distributed both across nations and stages of development.

“Humanity is now burning through the remaining carbon budget at a rapid rate, but historical emissions need to inform the future for just transitions to be achieved.”

Dr Laila Gohar concluded: “We need international cooperation and coordinated efforts to keep global temperature rise below 1.5°C. We need to see the peak of global greenhouse gas emissions before 2025 followed by reductions by 2030 or 2040.”

A spokesperson for the Department for Energy Security and Net Zero said: “The culmination of the Global Stocktake this year is crucial for demonstrating that we are holding ourselves to account on pledges made under the Paris Agreement. Its outcome should include commitments from countries to enhance their current targets, set ambitious new ones, and implement tangible climate solutions”

What needs to happen next?

Reducing methane emissions in conjunction with carbon-dioxide will help to keep the peak warming as low as possible. But as Camilla Mathison explains: “All mitigation pathways need to include some element of physical removal of carbon-dioxide from the atmosphere; but this should be in addition to deep and rapid reductions in greenhouse gas emissions.

“Some solutions, such as decarbonizing the energy sector, are already available and cost-effective. But progress will depend on regional circumstances and which sectors are the major emitters of

greenhouse gases in each country."

Mitigation alone is not enough

People around the world are already experiencing severe climate impacts, such as flooding and drought, that can be attributed to human-induced climate change. Some adaptation measures, from bolstering sea defences to upgrading water supply networks, are already being implemented to shield communities from some of the worst climate change impacts.

Dr Freya Garry is a Met Office climate scientist specialising in climate impacts and providing information for decision making around climate adaptation. Freya said "The scale of future climate adaptation will depend on the mitigation pathway humanity takes. Without rapid and ambitious mitigation the world will experience increasingly frequent and severe climate impacts, and added climate adaptation measures will be needed."

The recently-released synthesis report from the Intergovernmental Panel on Climate Change (IPCC) highlights many climate policies around the world considering adaptation measures. However, these measures are not yet widely implemented, partly due to limited finance. The IPCC says with sufficient support, adaptation measures can build resilience to climate risks and deliver broader benefits to society.

Freya adds: "There is a wide range of possible adaptation measures. Rapid mitigation – together with adaptation action where needed – can reduce the risk of damage to lives, homes and communities.

"However, some climate impacts will continue to grow in severity. For example, sea level will continue to rise for centuries in every mitigation pathway, because of the melting of land-based ice and because ocean warming lags behind atmospheric warming.

"If greenhouse gas emissions are not reduced rapidly, more and more places will reach limits on adaptation with communities unable to avoid climate change, leading to irreversible changes such as the loss of coastal or small island communities."

The Global Stocktake at COP28

The output from the Global Stocktake will be presented at COP28 in November 2023. This will include: lessons learned; how to overcome barriers and challenges to climate action; and the development of solutions.

Encouraging countries to update and strengthen their climate action pledges (known as Nationally Determined Contributions) is a key aim of the GST.

In addition, it should also inspire increasing international cooperation for climate action, including:

- mitigation;
- adaptation;
- and providing means of support, through capacity-building, finance and technology.

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